TECHNICAL SPECIFICATIONS

WASHINGTON STATE FERRIES

M.V. ELWHA DRY-DOCKING

CONTRACT NO. 00-6495

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TECHNICAL SPECIFICATIONS

For the following Technical Specifications, the Contractor is to provide all labor, material and equipment to accomplish each and every Bid Item unless otherwise specified.

The Specification Item sub-titles in brackets are for WSF internal use only, for Life Cycle Cost modeling. Bidders should ignore such bracketed sub-titles.

1. DRY-DOCK VESSEL
{MAINTENANCE}

A. M.V. ELWHA Vessel Particulars:

Length: 382'-2", Beam: 73'-2", Draft: 18'-9", Gross Tons: 2,813.

B. Dry-Dock Vessel for cleaning, painting, inspections, the Work specified herein, and any necessary repairs.

C. Block spacing shall be at 12-foot centers. Within twenty-four (24) hours of Docking, provide three (3) copies of the block position drawing to the WSF Inspector indicating the block positions used.

D. Vessel shall be blocked to expose the previous docking block positions. "BLOCK POSITION FORM", **Attachment No. 2** showing previous blocking position is provided.

2. TEMPORARY SERVICE
{MAINTENANCE}

A. Install one (1) telephone on board in a location designated by the Vessel Staff Chief Engineer. The telephone is to have one (1) outside line with toll-free access to Seattle and vicinity and, if different, one (1) line for local numbers. The telephone shall have touch-tone service if available from the contractor's telephone system.

B. Provide and maintain electricity, water, safe lighted gangway and trash removal services while Vessel is in the contractor's facility.

C. Provide Safety and Security for the entire Vessel throughout the construction, repair or preservation period until such time as the WSF has accepted redelivery of the Vessel. Every reasonable precaution shall be taken to protect the Vessel from the hazards of fire, flooding, pilferage, malicious damage, and other events including cataclysmic phenomena of nature.

D. Provide and maintain comprehensive and effective fire prevention and fire detection, and fire fighting programs and systems sufficient to ensure the safety and integrity of the Vessel. Provide personnel trained in shipboard fire fighting techniques and also trained to cooperate with and assist local fire fighting organizations. Provide sufficient shore fire lines to ensure an adequate supply of fire fighting water, at sufficient pressure, and maintain an adequate number of tested fire-hoses aboard the Vessel to effectively fight fires at any location in the Vessel.

E. Provide and maintain portable fire extinguishers in sufficient quantity, and of the appropriate type, to combat local fires of any class. Provide sufficient fire watches, including roving watches as may be required, to ensure that fires that may be inadvertently started by welding sparks or heat, electrical malfunction, or spontaneous combustion are detected, reported and promptly extinguished.

3. SEA CHEST ANODES INSPECTION
{MAINTENANCE}

A. Open the four (4) cathodic protection access plates in the sea chests. Units are located ahead of the sea valves, two (2) per engine room.

B. Remove existing anodes and install new WSF supplied anodes. Close up access plates using new gaskets, and grommets. The removed anodes will place on the Vehicle deck and remain property of WSF.

C. Prior to installing the new anodes, mechanically prepare the access cover plates, including the surface where the anode covers mount, to an SSPC-3 and apply two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, 5 mils (DFT) each coat.

4. RUDDER INSPECTION, NO. 1 AND NO. 2 ENDS
{MAINTENANCE}

A. Erect staging or provide suitable personnel lifting device on both sides of No. 1 and No. 2 End rudders to accomplish all affiliated work required and inspections.

B. Conduct a satisfactory pressure test for leaks in the presence of the WSF and USCG Inspectors. Pressure test will consist of using 42 inches of water with Manometer or 1.5 PSI on acceptable calibrated pressure gauge that has 1.5 at mid scale range. Accepted test is no leaks for One (1) Hour. Provide three (3) copies of the test results to the WSF Inspector.

C. Take and record clearances of rudder pintle and rudder stock bearings on No. 1 and No. 2 End Rudders.

D. Open the Vehicle Deck cover plates on the upper Rudder Stock Bearing and take clearances. Close up cover with new countersunk stainless steel sockets head cap screws and new gaskets. Submit three (3) copies of a written report of findings to WSF Inspector within twenty-four (24) hours of taking readings.

5. PROPELLER INSPECTION, NO. 1 AND NO. 2 ENDS
{MAINTENANCE}

A. Erect and remove staging in area around No. 1 (No. 1 propeller is also addressed in Item 35) and No. 2 End Propeller Blades as required to accomplish all affiliated work and inspections.

B. Polish the No.1 and No. 2 End Propellers by power disk sanding using 80 grit or finer abrasive. Thoroughly clean propeller blades and hub for nondestructive testing.

C. Inspect No. 2 End Propellers for damage and proper blade pitch; Conduct a mag-particle or dye penetrant test for surface cracks on the blades and hub in the presence of the WSF and USCG Inspectors and the Vessel Staff Chief Engineer. Submit three (3) copies of a written report of findings to the WSF Inspector within twenty-four hours of test completion.

6. WAUKESHA SEAL INSPECTION, NO. 1 AND NO. 2 ENDS
{MAINTENANCE}

A. Drain No. 1 and No. 2 End Outboard Stern Seal Unit. Properly dispose of oil.

B. Take Waukesha seal wear-down readings on No. 1 and No. 2 Ends in presence of the WSF Inspector and Vessel Staff Chief Engineer. Submit three (3) copies of a written report of findings to the WSF Inspector within twenty-four hours of taking readings.

C. Fill No. 1 and No. 2 outboard Waukesha seals with Hyperlube or STP.

7. VOID TANK INSPECTION
{MAINTENANCE}

A. Provide the services of a marine chemist to certify voids "SAFE FOR WORKERS TO ENTER". Provide light and ventilation as necessary. The Vessel's crew will open the 32 manholes. Close up the manholes using new gaskets and grommets.

PAINTING OF VESSEL AND HULL PRESERVATION

Special Note

(ATTACHMENT NO. 1)

Area Preparation, Surface Preparation, Grit Blasting, Paint Coatings, and Inspection for Vessel's hull, curtain plates, casing and super structure shall be in accordance with Washington State Ferries' Marine Coating Specification 1/02 unless otherwise specified in the following specifications.

8. FRESH WATER WASH
{MAINTENANCE}

A. Within twenty-four (24) hours upon Dry-Docking Vessel, perform a Low-Pressure Water Cleaning (LP WC) at 3,000 -3,500 PSI in accordance with SSPC-SP 12/NACE 5. The wand shall be held no more than 12 inches from surface being washed. The entire hull from the guard to the keel, including all horizontal and vertical surfaces of the guard, flat keel, rudders, sea chests and propellers shall be washed. The wash shall leave no visible growth or residue after the hull dries from washing.

B. Remove sea chest strainer plates prior to pressure wash and reinstall strainer plates upon completion of hull painting.

9. PREPARATION OF VESSEL HULL FOR GRIT BLASTING {MAINTENANCE}

NOTE:

Care shall be taken to avoid damage to the "Capac" anodes and reference cells. The anodes are located at frame 54 port and starboard, both ends, 9' above the keel. The reference cells are located on the Starboard side toward the No. 1 End and Port side toward the No. 2 End.

A. Install protective covering on propellers, propeller bearings, exposed shafting, CAPAC anodes and reference cell, all through-hull penetration and entrance ways to protect and prevent grit blast material from causing damage or entering Vessel. Blank the main sea suction openings from the inside while the valves are removed for maintenance, so the valve mounting flange may be painted on the inside diameter (ONLY WHEN REMOVED FOR SEA VALVE INSPECTION or Replacement).

B. Conduct a pre-blast inspection with the WSF Inspector and the Vessel Staff Chief Engineer.

10. GRIT BLAST HULL {MAINTENANCE}

NOTE:

For purpose of bidding assume that **5,000 Square Feet** of hull will require grit blasting to SSPC-SP6, Commercial Blast Cleaning. Upon completion of hull grit blasting, the contract will be adjusted upward or downward to account for the actual scope of grit blasting authorized by the WSF Inspector.

A. Grit blast areas of abrasion, corrosion or steel repairs on the hull from top of the vertical face of the guardrail to keel, including flat keel, sea chest, strainer plates and rudders to an SSPC-SP6, Commercial Blast Cleaning.

B. The ANTI-FOULING coating, for at least two (2) inches bordering the blasted area, shall be removed to existing ANTI-CORROSIVE coating and feathered to a smooth surface.

11. PAINTING OF VESSEL HULL, ANTI - CORROSION COATING {MAINTENANCE}

NOTE:

For bidding purposes assume that **5,000 square feet** of the hull will require the ANTI-CORROSION COATING. The contract will be adjusted upward or downward using the square footage determined in GRIT BLAST HULL Item.

A. Apply one (1) coat of INTERNATIONAL Intertuf 262 Series epoxy, Red, to a minimum of 5 mils (DFT) to surface areas prepared in the, GRIT BLAST HULL Item**.**

B. Apply one (1) coat of INTERNATIONAL Intertuf 262 Series epoxy to a minimum of 5 mils (DFT) of contrasting color to all surfaces painted in paragraph "A" of this Work Item.

12. PAINTING OF VESSEL HULL, BELOW WATERLINE ANTI - FOULING (SPOT COAT)

{MAINTENANCE}

NOTE:

For purpose of bidding assume that **3,000 square feet** of the hull will require the FIRST coat of ANTI-FOULING coating. The contract will be adjusted upward or downward using the square footage determined in GRIT BLAST HULL Item.

A. Apply one (1) coat of INTERNATIONAL Interviron Antifouling, BRA 640 RED, to a minimum of 5 mils DFT to all surfaces painted below the waterline in the Painting of Vessel Hull, Anti-Corrosion Coating Item.

13. PAINTING OF VESSEL HULL, BELOW WATERLINE ANTI - FOULING (FULL COAT)

{MAINTENANCE}

A. Apply one (1) full coat of INTERNATIONAL Interviron anti-fouling BRA 640 BLACK, to a minimum of 5 mils (DFT) to all surfaces of hull below the waterline.

14. DRAFT AND HULL MARKINGS

{MAINTENANCE}

A. Repaint all draft marks and underwater hull markings, using INTERNATIONAL Intergard Epoxy Acrylic FT Series, White**.**

15. PAINTING OF VESSEL HULL, ABOVE THE WATERLINE

{MAINTENANCE}

NOTE:

For purpose of bidding assume that **2,000 Square feet** of hull above the waterline will require painting. The contract will be adjusted upward or downward using the square footage determined in item GRIT BLAST HULL Item.

A. Apply one (1) coat of INTERNATIONAL Intergard Epoxy Acrylic FT Series, Medium Green, to a minimum of 2 mils (DFT) to all surfaces prepared above waterline in Painting Of Vessel Hull, Anti-Corrosion Coating Item.

16. PAINTING OF VESSEL GUARD
{MAINTENANCE}

A. Apply one (1) coat of INTERNATIONAL Intertuf 262, Series epoxy, Black, to a minimum of 5 mils (DFT) to the entire guard.

17. RELOCATION OF OVERBOARDS
{MAINTENANCE}

A. Modify and relocate overboard discharges, install new flexible shaft valve remote operating gear and deck boxes, new hull isolation valves **(the new Valves, flexible shaft valve remote operating gear and deck boxes will be supplied by WSF)**, and replace the existing wafer check valves with bronze swing check valves, for the Main Engines, SS Diesel Engines, and Bilge Pumps in accordance with **Attachment No. 3**, WSF DWG. 8200X–548–120–01, REV. B, dated 11/22/ 02 titled "SUPER CLASS, Relocate OVBD DSCG For Main Engines, SS Diesel Engines & Bilge Pumps."

B. Inserts will be marked out and approved by the WSF and USCG Inspectors **prior** to commencing of cropping out hull plate.

C. New pipe will be templated with minimum amount of Field weld joints. New pipe will be welded, cleaned and flushed; tested, and then galvanized in the shop. All shipboard-welded joints will be kept to a minimum and be cleaned prior to testing. Upon a satisfactory inspection and test, apply Galvicon to the exterior of all shipboard welded joints and to all internal weld joints that are reachable.

D. All inserts, valves, reach rods and new piping will be tested to the satisfaction of the WSF and USCG Inspectors prior to painting. Provide three (3) written copies of the test and inspection results, and the list of make, model, size, of the new valves and reach rods (including lengths) installed to the WSF Inspector.

E. New steel will be prepared to an SSPC-6; Commercial Blast Cleaning, all other surfaces and damage paint from this work item will be prepared to an SSPC-3, Power Tool Cleaning. Removal of Kel-coat may be required in areas affected by this work.

F. Exterior surface of the hull that is affected by this work item will be painted with two (2) coats of INTERNATIONAL Intertuf 262 series epoxy, to a minimum of 5 mils (DFT) each coat.

G. On the Interior of the hull surfaces: apply two (2) coats of INTERNATIONAL Intertuf 262 series epoxy; to a minimum of 5 mils (DFT) each coat.

18. DRY - DOCKING REFERENCE VIDEO
{MAINTENANCE}

A. While the Vessel is on the Dry-Dock, make a video tape in VHS format of all external areas of the underwater hull, including rudders, stern frames, skegs, propellers, tail shaft/seal areas, hull protective systems, keel coolers, sea chests, hull reference markings and all other attached objects and appurtenances, with a verbal narrative that unambiguously identifies the location of all objects and markings.

B. The video is to be made after all underwater work is complete, just prior to refloating the Vessel. The lighting shall be sufficient to assure clear definition of all objects video taped. Background noise shall be minimized while making the narrative. Provide three (3) copies of the video to the WSF Inspector.

NOTE:

This video is for submission to a Regulatory Body and requires clarity and audibility to satisfy their requirements.

19. REPLACEMENT OF NO. 1 AND NO. 2 END STEERING GEAR HATCHES
{MAINTENANCE}

A. Remove the existing steering gear hatches, ladders, hatch drains, install new hatches, ladders, hatch drains, and reroute the steering gear hydraulic piping, equipment and hoses, and conduct the flushing and hydrostatic testing IAW **Attachment No. 4** DWG. 8204X-603-004-01, Rev. A, dated 12/11/02, titled "M/V ELWHA, Steering Gear Room Access Hatches" and **Attachment No. 5** DWG. 8203X-400-81-1, REV. C, dated 12/2/02, Titled "SUPER CLASS Steering System Modifications".

B. Install two (2) new WSF supplied Hatches (one (1) for each Steering Gear Compartment), 36" x 36" clear opening, 3/8" thick Cover, watertight, flush deck, spring balanced, operable by key and socket from above and by hand wheel from below, self draining with a 1-1/2" opening, spring balanced, hatches for access to each No.1 and No. 2 End Steering Gear Rooms.

C. Hatches will be all steel construction with stainless steel springs, stainless steel dogs, and bronze hand wheels. Hatches will be U.S. Coast Guard approved.

D. Upon completion of the installation of the hatches, and prior to painting, conduct satisfactory water hose test of installation in presence of the WSF and USCG Inspectors. No leakage will be allowed. Provide the WSF Inspector with three (3) written copies of the test results.

E. Upon completion of the installation of the hatch drain, and hydraulic piping, and prior to painting, conduct a satisfactory operational and leak test of the steering system and hatch drain in the presence of the WSF and USCG Inspectors, and Vessel Staff Chief Engineer.

F. Prepare all the disturbed areas to an SSPC-SPC3, Power Tool Cleaning.

G. On the interior of the hull surfaces: apply two (2) coats of INTERNATIONAL Intertuf 262 series epoxy; to a minimum of 5 mils (DFT) each coat. Apply topcoat of INTERNATIONAL Intergard Epoxy Acrylic FT Series at a minimum of 2 mils (DFT), to match existing color.

H. On the vehicle deck side of the hatches, apply two (2) coats of AMERON Bars-Rust 235 haze gray, to a minimum of 6 mils (DFT). Apply a topcoat of AMERON 229, Signal Yellow, to a minimum of 2 mils (DFT). Centered on the hatch, apply the letters, "KEEP CLEAR"; these letters shall be a full coat of AMERON 229, Safety Red, to a minimum of 2 mils (DFT).

20. INTERIOR HULL PRESERVATION
{MAINTENANCE}

A. Prepare the surfaces of the hull under the two (2) Fire Pumps foundations (One (1) in each Engine Room) to an SSPC-SP3, power tool cleaning.

NOTE:

For purpose of bidding assume that **75 Square feet**, under each fire pump, for a total of 150 square feet, will require preparation and painting. The contract will be adjusted upward or downward to account for the actual scope of preparation and painting authorized by the WSF Inspector.

B. Apply two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, to a minimum of 5 mils (DFT) each coat.

21. INSTALL LINE SHAFT BEARING BRACES
{MAINTENANCE}

A. Install braces on the line shaft bearings just AFT of the thrust bearings on the No. 1 and No. 2 Ends IAW **Attachment No. 6,** WSF DWG. 8200X-601-002-01 REV. -, dated 10/22/02, titled "SUPER CLASS HYAK / ELWHA Line Shaft Bearing Foundation Bracket."

B. Prepare the surfaces of the new and disturbed areas to an SSPC-SP3, Power Tool Cleaning.

C. Apply two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, to a minimum of 5 mils (DFT) each coat.

22. PRESSURE WASH TOPSIDE AND VEHICLE DECKS
{MAINTENANCE}

A. Low Pressure Fresh Water Clean (LP WC) the entire exterior of the Vessel from the Vehicle Deck to the Top of the mast, at 3,000-5,000 PSI to achieve a condition of SC-1 IAW Table 2 (Non-visual Surface Preparation Definitions) in SSPC-SP 12/NACE 5. The wand will be held no more than twelve (12) inches from surface being washed. Use ZEP BIG ORANGE or equal when washing, **DO NOT** use AMERON, Prep 88 or International GMA, since the intent is to do a spot coat preservation, and WSF does not wish to etch paint in areas which will not be over coated. The area to be washed is the entire exterior surface and exterior components of the Vessel. These areas include the: Shelter deck areas; Vehicle deck areas; exterior Curtain Plate and Passenger Cabin House Sides, Stairwells; all Appurtenances; Masts, Stacks including Stack Tops; Pilot house and Pilot House Tops; Crew Quarters and Crew Quarters House Tops; all External Surfaces of the Passenger Decks, Vehicle Decks including the Exterior Overheads, Bulkheads, Pockets which are opened to the weather in the Casings, Decks, Stairwells and Shelter Areas; Rescue Boat Stations, Anchor handling areas, all Deck Screens and stanchions, Deck Coamings. It is the intent of this item to wash the entire exterior surface of the Vessel.

B. Clean all exterior windows upon completion of Water Wash. Glass to be cleaned to remove all dirt, paint, water streaks and other foreign matter. Care will be taken to prevent scratching of window surface.

NOTE:

The contractor is advised to exercise care and caution to assure that all insulation, light fixtures, speakers cabling, alarms, signage, and appurtenances are protected and not damaged by the fresh water wash down.

23. TOPSIDE PAINTING, PREPARATION AND SPOT COAT
{MAINTENANCE}

A. Prepare various areas throughout the Exterior of the Vessel to an SSPC-SP 3, power tool cleaning. Smooth or glossy surfaces will not be acceptable. These areas will include Promenade Deck, Texas Deck, Vehicle Decks, and the Outboard Curtain Plates and Overheads.

NOTE:

For bidding purposes, assume that a total of **2,000 square feet**, in various areas will require SSPC-SP 3, Power Tool Cleaning, and will be coated with two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy, 5 mils (DFT) each coat; apply a topcoat of INTERNATIONAL Intergard Epoxy Acrylic FT series at a minimum of 2 mils (DFT) to match existing color.

B. Upon completion of the preparation and painting, the Contract will be adjusted upward or downward to account for the actual area authorized by the WSF Inspector.

24. TOPSIDE PAINT, GREEN COAT
{MAINTENANCE}

1. Apply one (1) full coat of International Intergard Epoxy Acrylic FT series, Green, at a minimum of 2 mils (DFT) to the portions that are painted Green on the Port and Starboard Curtain Plate, No. 1 End and No. 2 End Pilot House Tops and both Stacks.

25. REPLACE THE EXISTING EOS / ENGINE ROOM ACOUSTIC DOORS
{MAINTENANCE}

A. Replace the existing metal joiner doors in way of the horizontal, sliding, watertight doors between the EOS (Engineering Operating Station) and each Engine Room at each Watertight Bulkhead at Frame No. 6. The new replacement doors will be WSF supplied and will be McGeoch Marine LTD. A-60 Weather tight Fire Doors. Their clear openings shall match the ELWHA'S existing doors, which are approximately 24" wide by 65" high with about a 12" sill. Bidders are encouraged to ship check the M/V ELWHA to detail exact dimensions and configuration. These new replacement doors, with their frames will need to be fit properly into the existing ship's bulkhead structure.

B. Install new hardware for these new replacement doors. Provide new locksets, BEST 34H-14J626- MORTIS TYPE. Provide new door closers LCM MODEL 4041.

C. After door installations the new doors will be inspected for sound leaks with the machinery operating. Approved silicone caulking and door seal adjustments may be used to eliminate sounds leaks.

D. Upon completion of door installation demonstrate to the WSF Inspector and the Vessel Staff Chief Engineer that the adjacent Watertight Doors operate with no interference with the newly installed doors.

26. REPLACE THE FOUR (4) HULL CAPAC ANODES AND TWO (2) REFERENCE CELLS {MAINTENANCE}

A. Replace the four (4) hull CAPAC ANODES, CAPASTIC and the two (2) REFERENCE CELLS IAW **Attachment No. 7**, titled "SUPER CLASS, Capac System Dielectric Shield For 8ft. Anodes, Information Sheet". **WSF will supply the Anodes, Capastic and Reference Cells.**

1. Remove the existing anodes and reference cells; install covers over hull penetrations to prevent grit blast material from entering Vessel during Capastic removal.

2. Grit blast areas of the Capastic and anodes to an SSPC-SP6, Commercial Blast Cleaning.

3. Install the new Capac Anodes and Reference Cells; conduct meggar and electrical tests to ensure the new installation is properly installed. Provide the WSF Inspector with three (3) copies of the meggar and electrical test results.

4. Conduct a satisfactory test to insure installation is watertight. Provide the WSF Inspector with three (3) written copies of the test results.

5. Apply the supplied capastic around the CAPAC ANODES; the capastic shall be applied to a minimum thickness of 1/8 inch in the area of the shield in area around the anode. Build up a minimum of 22 mils (DFT) of epoxy Anti-Corrosion Coating over the applied capastic areas and the secondary dielectric shield areas.

27. AUDIO GAUGE HULL
{MAINTENANCE}

A. Perform an ultrasonic survey of the Vessel's steel plating thickness in the following locations: two (2) girth belts (including vehicle deck), one (1) at Frame No. 32, No. 1 End; and one (1) at Frame 32, No. 2 End (60 shots per belt); plates in the wind and water areas, Port and Starboard sides, full length (70 shots per side); keel plating (30 shots); Vehicle deck and superstructure areas (50 shots); in suspect areas as directed by the WSF Inspectors (50 shots). The survey shall be performed in the presence of the WSF and USCG Inspectors. Estimate 390 shots will be required.

B. The readings shall be taken from the exterior of the hull when the Vessel is in Dry-Dock. The exact areas to be surveyed will be designated by the WSF and USCG Inspectors. Provide a personnel lift capable of reaching all portions of the hull from the top of the guard down. The readings may be taken through the paint in areas of smooth surface if equipment is capable. In areas disturbed by this work, remove and restore paint as necessary, using the proper coating system.

C. Provide the WSF Inspector with three (3) written copies of the report in a tabular form, identifying the locations of reading by location, original plate thickness, audio gauge reading taken, and percent of wastage. Attach a schematic showing the locations where the shots were taken and the thickness found.

28. GRIT BLASTING NO. 1 AND NO. 2 ENDS, RUDDERS, RUDDER HORNS, STERNTUBE BOSSES AND SKEG
{MAINTENANCE}

A. Grit blast the rudders, rudder horns, and stern tube bosses, (in the areas designated by the WSF Inspector), to an SSPC-SP 5 **White metal blast,** with a profile of 4 to 6 mils,(required for Duraflake applications). **(80 square feet** each end for a total of **160 square feet).**

NOTE:

For bidding purposes, assume a Total of **160 Square Feet** will be required to be grit blasted. Contract will be adjusted upward or downward to account for the actual area authorized by the WSF Inspector.

29. WELD REPAIRS NO. 1 AND NO. 2 ENDS, RUDDER AND RUDDER HORNS

{MAINTENANCE}

A. Clean and gas free Rudder spaces associated with the work, as necessary, and obtain a Marine Chemist certification for "SAFE FOR WORKERS", and "SAFE FOR HOT WORK". Maintain the certificate during the course of the work.

B. Back gouge weld butts on No. 1 and No. 2 Rudders in way of eroded areas as authorized by WSF Inspector, and build up the weld butt **(entire length)** to above the plate surface sufficiently to allow grinding to a smooth even surface. Other eroded areas will be repaired in a similar manner.

NOTE:

For bidding purposes, assume a total of **100 lineal feet** of multi pass welding applied with single ¼ inch stringer beads on both No. 1 and No. 2 Rudders for a total of **200 lineal feet**. Upon completion of the welding the Contract will be adjusted upward or downward to account for the actual area authorized by the WSF Inspector.

30. WELD REPAIRS NO. 1 AND NO. 2 ENDS, STERNTUBE BOSSES AND SKEGS

{MAINTENANCE}

A. Weld up areas of pitted surfaces on the skegs and sterntube bosses as authorized by the WSF Inspector. Welds to be built up to above the plate surface sufficiently to allow grinding to a smooth even surface.

NOTE:

For bidding purposes, assume a total of **4 areas (1 foot by 1 foot)** will require multi pass welding applied with single ¼ inch stringer beads on both No. 1 and No. 2 End skeg and stern tube bosses for **a total of 8 Square feet**. Upon completion of the welding the Contract will be adjusted upward or downward to account for the actual area authorized by the WSF Inspector.

31. APPLICATION OF DURAFLAKE

{MAINTENANCE}

A. Apply a coating of Marine Grade Duraflake around the leading edge of both rudders and outward on rudders to approximately Fr. 83. Apply Duraflake coating to the rudder horns, sterntube bosses and skeg areas, as directed by the WSF Inspector.

NOTE:

For bidding purposes, assume a Total of **105 Square Feet** for No. 1 and No. 2 Ends, for a **total of 210 Square Feet**. Contract will be adjusted upward or downward to account for the actual area authorized by the WSF Inspector.

B. Apply the Marine Grade Duraflake to a depth of 40 mils in accordance with the Duraflake representative's instructions. A Kevlar wrap shall be included in the Duraflake system. Supervision of the Duraflake installation shall be obtained from Corrosion Specialists Incorporated. The contact is Mr. Brad Bradshaw, (360) 568-2098.

C. Grind the entire surface of the Duraflake smooth to prevent cavitation. No rough edges will be allowed.

D. Apply underwater paint coating system as described in Painting of Vessel Hull, Below Waterline, Anti-Fouling (Full Coat) Item.

32. GENERAL ALARM SYSTEM MODIFICATION
{MAINTENANCE}

A. Install a new General Alarm Contact Maker in E.O.S. in accordance with **ATTACHMENT No. 8,** WSF DWG. No. 8204X-571-95-1 REV. – dated 3/21/02, titled "General Alarm System Modification For E.O.S. Contact Maker". The WSF Inspector will designate actual mounting location. Upon completion of installation, the new Contact Maker will be tested to the satisfaction of the WSF and USCG Inspectors. Provide the WSF Inspector with three (3) copies of the test results.

B. Prepare all areas of new installation and damaged paint affected by this Item to SSPC-SP3, Power Tool Cleaning.

C. Apply one (1) coat of INTERNATIONAL Intertuf 262 series Epoxy, to a minimum of 5 mils (DFT), and topcoat with INTERNATIONAL, Interthane PC series at a minimum of 2 mils (DFT) of the proper color.

33. INSTALLATION OF VOYAGE DATA RECORDER
{MAINTENANCE}

A. Install the WSF furnished Voyage Data Recorder system in accordance with **Attachment No. 9**, titled "Voyage Data Recorder Installation for M.V. ELWHA, Final Submittal", dated December 2002.

B. Conduct a satisfactory operational test to the satisfaction of the WSF and USCG Inspectors. Provide the WSF Inspector with three (3) written copies of the test results.

C. All new steel will be prepared to an SSPC-SP 10, Near White Blast Cleaning. Existing painted surfaces affected by this work will be prepared to a SSPC-3, Power Tool Cleaning.

D. Apply one (1) coat of INTERNATIONAL Intertuf 262 series Epoxy, to a minimum of 5 mils (DFT), and topcoat with INTERNATIONAL, Interthane PC series at a minimum of 2 mils (DFT) of proper color, to all prepared areas.

34. INSTALLATION OF AUTOMATIC DRAFT INDICATION SYSTEM {MAINTENANCE}

A. Install the WSF furnished Automatic Draft Indication System as indicated on **Attachment No. 10,** WSF DWG No. 8204X-607-095-01, Rev.-, dated 12/03/02, titled "M/V ELWHA, Automatic Draft indication System Electrical Installation**; Attachment No. 11,** WSF DWG No. 8204X-607-002-01, Rev.-, dated 12/06/02, titled "M/V ELWHA, Automatic Draft indication System Hull Installation; **Attachment No. 12,** WSF DWG No. 3828-090-01, Rev. G, dated 10/02/01, titled "Super Class, Major Rehabilitation Electrical One (1) Line Diagram"; and **Attachment No. 13**, (WEIR-JONES) 8268-ADIS-PROPOSAL-REF-A0, dated 11/04/02, titled "General Equipment And Technical Specs Of The Automatic Draught Indicator Sys."

B. Equipment vendor, vendor contact information, and spare parts are listed on **Attachment No. 10**. System installation will include four (4) each, ultrasonic transducers and mounting hardware, located IAW **Attachment No. 11**; Two (2) each, wheelhouse display units, One (1), each system central processing unit, One (1), each system printer, (all located IAW **Attachment No. 10**) and all cabling, connection boxes and hardware.

NOTE:

Attachment Nos. 12 and 13 are provided for informational purposes ONLY.

C. Within the first five (5) days of Vessel arrival, provide WSF Inspector with the exact length of Transceivers Support Pipes that will be installed through the "guard".

D. After equipment installation is complete, the Contractor will obtain the services of Weir-Jones Engineering Ltd, the equipment vendor, to accomplish system startup/commissioning, and any calibrations necessary.

E. Conduct a satisfactory operational test to the satisfaction of the Weir-Jones Engineering LTD. Vendor Representative, the WSF and USCG Inspectors. Provide the WSF Inspector with three (3) written copies of the test results.

F. All new steel will be prepared to an SSPC-SP 10, Near White Blast Cleaning. Existing painted surfaces affected by this work will be prepared to a SSPC-3, Power Tool Cleaning.

G. Apply one (1) coat of INTERNATIONAL Intertuf 262 series Epoxy, to a minimum of 5 mils (DFT), and topcoat with INTERNATIONAL, Interthane PC series at a minimum of 2 mils (DFT) of proper color, to all prepared areas.

35. NO. 1 END PROPELLER REMOVAL, REPAIR AND INSTALL {MAINTENANCE}

A. Erect staging in area around No. 1 End propeller to accomplish all affiliated work required and inspection. Remove staging upon completion of all affiliated work.

B. Remove the No.1 propeller and transport to ROLLS ROYCE for balance and pitch check, and to conduct a mag-particle or dye penetrate test for surface cracks on the blades, key ways, and hub in the presence of the WSF and USCG Inspectors within two (2) working days of Vessel being dry-docked. Submit four (4) copies of a written report within twenty-four (24) hours of inspection to WSF Inspector. Upon completion of inspection and necessary repairs, transport propellers back to Vessel and install.

C. On the No.1 tailshaft, conduct a nondestructive test for cracks on tail shaft taper and threads, nut, key and key way. Submit four (4) copies of a written report within twenty-four (24) hours of inspection to WSF Inspector.

D. Install No. 1 End propeller. Nut hardening to be witnessed by the WSF and USCG Inspector and the Vessel's Staff Chief Engineer.

36. REPAIR NO. 1 END OILY BILGE TANK {MAINTENANCE}

A. Crop out deteriorated steel in area by suction line, approximately 2' x 2' piece. This tank is round and material is 7.65lb. plate ABS grade B steel. Tank will be empty.

B. Clean and gas free tank as necessary, and obtain a Marine Chemist certification for "SAFE FOR WORKERS", and "SAFE FOR HOT WORK". Maintain the certificate during the course of the work.

C. Upon completion of repairs, and prior to painting, conduct satisfactory mag. Particle test in presence of the WSF and USCG Inspectors and Vessel Staff Chief Engineer. Provide the WSF Inspector with three (3) written copies of the test results.

D. All new steel will be prepared to an SSPC-SP 10, Near White Blast Cleaning.

E. Prepare internal tank surface and existing painted surfaces affected by this work to a SSPC-3, Power Tool Cleaning.

F. Apply two (2) coats of INTERNATIONAL Intertuf 262 series Epoxy at a minimum of 5 mils (DFT) each coat for a total of 10 mils (DFT) to all areas prepared in this Item.

(END)